

WAC 173-160-453 What are the minimum standards for construction of ground source heat pump borings? (1) General requirements.

(a) Applicability of minimum standards. The minimum standards set forth herein apply to all ground source heat pump borings as defined in WAC 173-160-111.

(b) Prohibition against other uses. Ground source heat pump borings cannot be used for any purpose other than heat exchange. After completion, ground source heat pump borings shall not be converted to any other type of well except by written approval by the department. The operator shall ensure that the ground source heat pump boring is constructed according to this chapter.

(2) Location of ground source heat pump borings.

(a) A ground source heat pump boring shall not be located within one hundred feet from any water supply well.

(b) The setback from public water supply wells for ground source heat pump borings must comply with applicable department of health sanitary control zone regulations for the public water supply wells. Where the sanitary control zone is greater than one hundred feet the setback should reflect the expanded distance.

(c) Variances to the standard setback for water supply wells can be obtained when:

(i) The approved sanitary control zone for the public supply well is less than one hundred feet. Notification and concurrence is required from the department of health to insure that the new setback is consistent with the approved public water supply well sanitary control zone. Variances for public supply wells will be issued by the local or state health authority.

(ii) The water supply well is not a public water supply well and the reduced set back is adequate to protect against encroachment on the well and can provide adequate protection against potential contamination. The reduced set back shall be no less than seventy-five feet.

(d) No variance shall be approved for a setback less than the approved sanitary control zone for a water supply well, unless it can be demonstrated that the water supply well is hydrogeologically protected from any potential threat posed by the closed-loop heat system.

(3) Construction standards for ground source heat pump borings. Site specific conditions shall be assessed to determine the best method and materials to be used for sealing the well annulus to protect the groundwater.

(a) Casing material. If permanent casing is needed in a ground source heat pump boring, it must meet standards set out in WAC 173-160-201 for steel and for plastic.

(b) In a closed-loop ground source heat pump boring, the material used to make up the heat exchange loop that is placed into the ground must be able to withstand the typical forces which act upon it during and after construction. It shall be resistant to the corrosive effects of the surrounding formations, earth, water, and heat exchange fluids within the pipe.

(c) Pressure testing. Pressure testing will be done in accordance with manufacturer recommended specifications. The closed-loop assembly pipe within the bore hole shall not leak or cause contamination to the groundwater.

(d) All fluids used in the construction and testing of ground source heat pump borings will be handled and utilized in a manner that does not contaminate the groundwater or surface water.

(e) Bore hole size. The hole size for ground source heat pump borings must be of sufficient size to allow placement of the heat exchange loop and tremie tube to the bottom of the hole.

(f) No more than one heat exchange loop can be placed in one bore hole.

(g) Grouting of an uncased bore hole. Grouting (sealing) the bore hole of a ground source heat pump boring must be completed immediately after the heat exchange loop is installed to avoid cave in of the uncased hole. The near surface area where the ground source heat pump borings will be connected to a manifold to connect it to the closed-loop system may be filled with earth materials.

(i) Sealing must be done with an active solids content bentonite grout slurry (minimum twenty percent active solids by weight) per WAC 173-160-221. Use of controlled density fill (CDF) and fly ash is prohibited.

(ii) Sealing material placed in the bore hole shall be uncontaminated; drilling fluids must be purged from the bore hole during the installation of the sealing material. Neither cuttings from the drilling process nor drilling fluid shall be used as bore hole sealing material.

(iii) Mixes of bentonite slurry shall be installed by pumping through a tremie tube in a continuous operation using a positive displacement method. Polymer additives designed to retard swelling are acceptable for use with the bentonite slurry per WAC 173-160-450. The tremie tube will extend to the full depth of the bore hole before pumping begins. Minimum slurry volume used must be equal to or exceed the calculated annulus volume of the bore hole. Grouting material shall surround all pipes remaining in the bore hole to land surface.

(h) Grouting of a permanently cased bore hole shall be sealed in accordance with this chapter. Exception: When the casing is perforated from bottom to land surface and is pressure grouted in accordance with WAC 173-160-381 (1)(a).

(i) Unsuccessful installation of a ground source heat pump boring. If grouting is not successful, the department must preapprove an alternate completion of the ground source heat pump boring. If an alternate completion is not approved, the well must be properly decommissioned.

(j) An open-loop system must meet the construction standards of a water well. If the withdrawal of groundwater exceeds the exemption requirements of RCW 90.44.050, a water right permit is required.

(k) It shall be the responsibility of the driller to properly construct the bore hole, pressure test the loop pipe, install the loop pipe, and grout the bore hole.

[Statutory Authority: Chapter 18.104 RCW. WSR 09-01-125 (Order 08-10), § 173-160-453, filed 12/19/08, effective 1/19/09; WSR 06-23-121 (Order 06-08), § 173-160-453, filed 11/21/06, effective 12/22/06.]